X. *Notice of the remains of the recent Volcano in the Mediterranean.* By JOHN DAVY, *M.D. F.R.S. Assistant Inspector of Army Hospitals.*

Read March 8, 1833.

IN consequence of an examination made by Captain SWINBURNE, R.N., of the shoal formed by the subsidence of the volcanic island which was thrown up in the summer of last year, I am enabled to give a few more particulars respecting it, which I beg leave to communicate to the Royal Society, not so much on account of the importance of the particulars themselves, as for the sake of endeavouring to contribute as much as possible towards the history of the volcano.

I shall insert an extract from a letter of Captain SWINBURNE, containing the results of his examination, dated the 24th of August, addressed by him to the admiral on the station, and which was published in the Malta Gazette of the same date.

"It" (the volcano) "has left a dangerous shoal, consisting principally of black sand and stones, with a circular patch of rock in the middle of it, about forty-two yards in diameter, on which there are two fathoms water generally, but in one spot only nine feet. All round the rock there are from two and a half to three fathoms, deepening gradually to five and six fathoms at the average distance of one hundred yards from the centre, then more rapidly to ten, twenty, thirty, forty, &c. fathoms.

"A small detached rock with fifteen feet on it lies one hundred and thirty yards to the S.W. of the central patch. About three quarters of a mile N.W. of the centre there is a detached bank with twenty-three fathoms on it. All the rock appears to be dark-coloured porous lava, and the sand (which is extremely fine in the deepest water,) is composed entirely of particles of the same substance. By this the soundings near the shoal may be distinguished; but it should be approached with great caution, as a large extent of discoloured but deep water which lies to the S.W. may be mistaken for it, while the real

danger is seldom visible till it is near, being composed of very dark-coloured materials, and it is so deep that the lead cannot be trusted. Its latitude and longitude, as far as my limited means of observation enable me to decide, are 37° 9′ N. and 12° 43′ E. of Greenwich."

In conversation with Captain SWINBURNE previous to his proceeding to examine the shoal, I mentioned to him as a desideratum, the collecting a portion of any air which might be seen rising from the site of the volcano; and, on his return into port on the 22nd of August, he obliged me with two specimens which he had procured. They were contained in wine-bottles, which were corked and inverted in water. Each bottle was about half-full of air. According to Captain SWINBURNE's statement, the air was collected and preserved with all possible care, so as to preclude the possibility of any admixture of external atmospheric air. In a letter with which this gentleman has favoured me on the subject, after describing how the air was collected and preserved, he adds: "It came up in many places in small silver threads of bubbles; the quantity varied from time to time in the same place, and where it was most plentiful, the bottom, looking at it through a water-glass, had somewhat the appearance that is observed in chalybeate springs; the cinders (elsewhere quite black) had a rusty appearance. I could detect no difference in the temperature of the water at these spots, nor any between the water on or near the shoal and that at a distance from it."

On the 23rd of August, about twelve hours after I had received the bottles of air, I examined them. On withdrawing the corks under water, in neither bottle was there any diminution of the volume of the air;—no indication of any absorption having been produced by the salt water with which it had been in contact for several days. Though collected at some distance from each other, I found both specimens of air very nearly similar. Neither of them was inflammable, nor had any smell of sulphuretted hydrogen, nor was absolvable by lime water, and both extinguished flame. Forty-one measures of one, by phosphorus were diminished to 37, and thirty-five measures of the other were diminished to 31·5; indicating the presence of between nine and ten parts of oxygen, mixed with between seventy-nine and eighty of azote.

The origin of this air must necessarily be matter of speculation. Two views may be taken of it. It may either be supposed to have arisen from the extinct

volcano; or, to have been disengaged from sea water at the bottom in contact with, and penetrating into the loose and probably hot ashes and cinders composing the shoal. The situation of the volcanic shoal so far from land, and all the circumstances best authenticated relative to the volcano when in activity, seem very unfavourable to the first supposition. The second supposition seems more reasonable. Had the air consisted of oxygen and azote in the same proportions as exist in the atmosphere, it would hardly be a subject for question. The presence of about as much as ten per cent. oxygen is strong proof that the source of the air was not very deep, not beneath the bed of the sea. Supposing it disengaged from the water, as alluded to, it is easy to conceive how it might be deprived of its oxygen. The oxygen of atmospheric air absorbed by sea water probably becomes less and less in quantity with the depth to which it penetrates, both from the action of living and dead matter swimming and suspended in the water, so that in a very deep sea not a particle of oxygen may reach the bottom. In addition to which general causes for the abstraction of oxygen, in the instance of this shoal there appears to have been a special one in operation; viz. the black oxide of iron entering into the composition of the cinders and ashes derived from the volcano. Now, as Captain SWINBURNE expressly states, that where the air rose, there "the cinders had a rusty appearance," indicating the conversion of the black oxide into red, it clearly follows that the change must have been owing to an absorption of oxygen; and it can hardly be doubted that it was derived from the air in question. I may add, that the minute quantity in which the air was disengaged, is favourable to the second supposition rather than the first. Rising "in silver threads of bubbles," as described by Captain SWINBURNE, is what might be expected on the idea of its being disengaged by the water. Had it been evolved in large volumes, then this source would have been inadequate, and it would have been necessary to have sought for it deeper, in connexion with, or as a product of the volcano. To obviate a possible objection, I would further beg to add, that the temperature of the water at the surface, where the gas was ascending, being the same as in the adjoining sea, is no proof that at the bottom it was not higher. What I witnessed in relation to the temperature of the sea close to the volcano when it was in activity, as described in my first communication to the Society, is sufficiently demonstrative of this.

The explanation just proposed of the origin of a mixture of oxygen and azote in this instance, may probably admit of wide extension, and may be applicable to all hot springs from which azote is disengaged, whether pure, as in a few examples, or mixed with other gases, as is more common. The water feeding the springs, derived from the atmosphere, on entering the ground, must contain a certain quantity of common air; the oxygen of which, from a variety of substances attracting it, may be separated and absorbed in the descent and re-ascent of the water through the strata of the earth, whilst the azote will remain free to be disengaged from elevation of temperature, or removal of pressure when the spring bursts forth at the surface.

Malta,
November 15*th*, 1832.


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WESTERN ISLAND
St Kilda
Line of 70 Fms.
40 fms.
20 fms.
VI
VII
V
Malin Hd
Tory Id.
Foyle
Line of 70 Fathoms


7
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5
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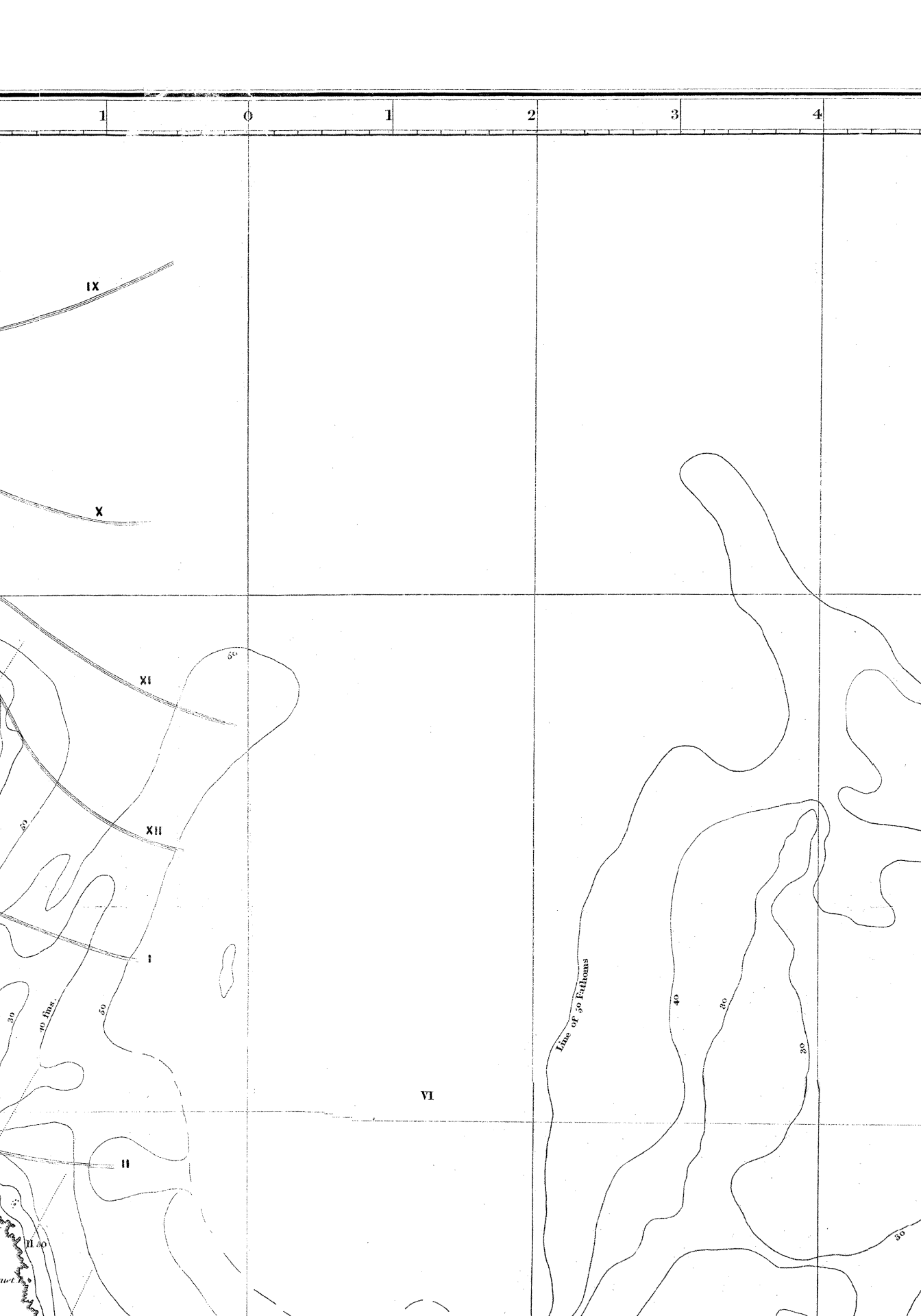
2
1
ORKNEY ISLANDS
North Ronaldsha
Stromness
Hoy
South Ronaldsha
Duncansby Head
Thurso
Sinclairs Bay
Wick
Ord of Caithness
Line of 50 Fathoms
Bara
Rona
40 fms
Wrath
Loch Laxford
L. Lowie
Loch Enard
Loch Broom
Loch Groinard
Gare Loch
Loch Terridon
Applecross B.
Loch Carron
L. Hourn
L. Nevish
Loch Aylort
Loch Sunart
Linnhe Loch
L. Leven
L. Etive
Inverary
L. Fine
Dumbarton
Greenock
Ardrossan
Ayr
Garvin
Cantire
Mull of Cantire
Rathlin
Foyle
Icolmkill
Islay
S C O T L A N D
ISLANDS
LEWIS
Harris
THE MINSH
LITTLE MINSH
SKYE
Rum
Dornoch
Dornoch Firth
Tain
Murray Firth
Cromarty
Inverness
Elgin
Banff
Kinnairds Hd.
Peterhead
Newburg
ABERDEEN
Stonehaven
Montrose
Arbroath
PERTH
Firth of Tay
St. Andrews
Fife Ness
Leven
Kinghorn
Firth of Forth
Dunbar
Leith
EDINBURGH
St. Abbs Hd.
Berwick
Eymouth
Sunderland Pt.
Coquet I.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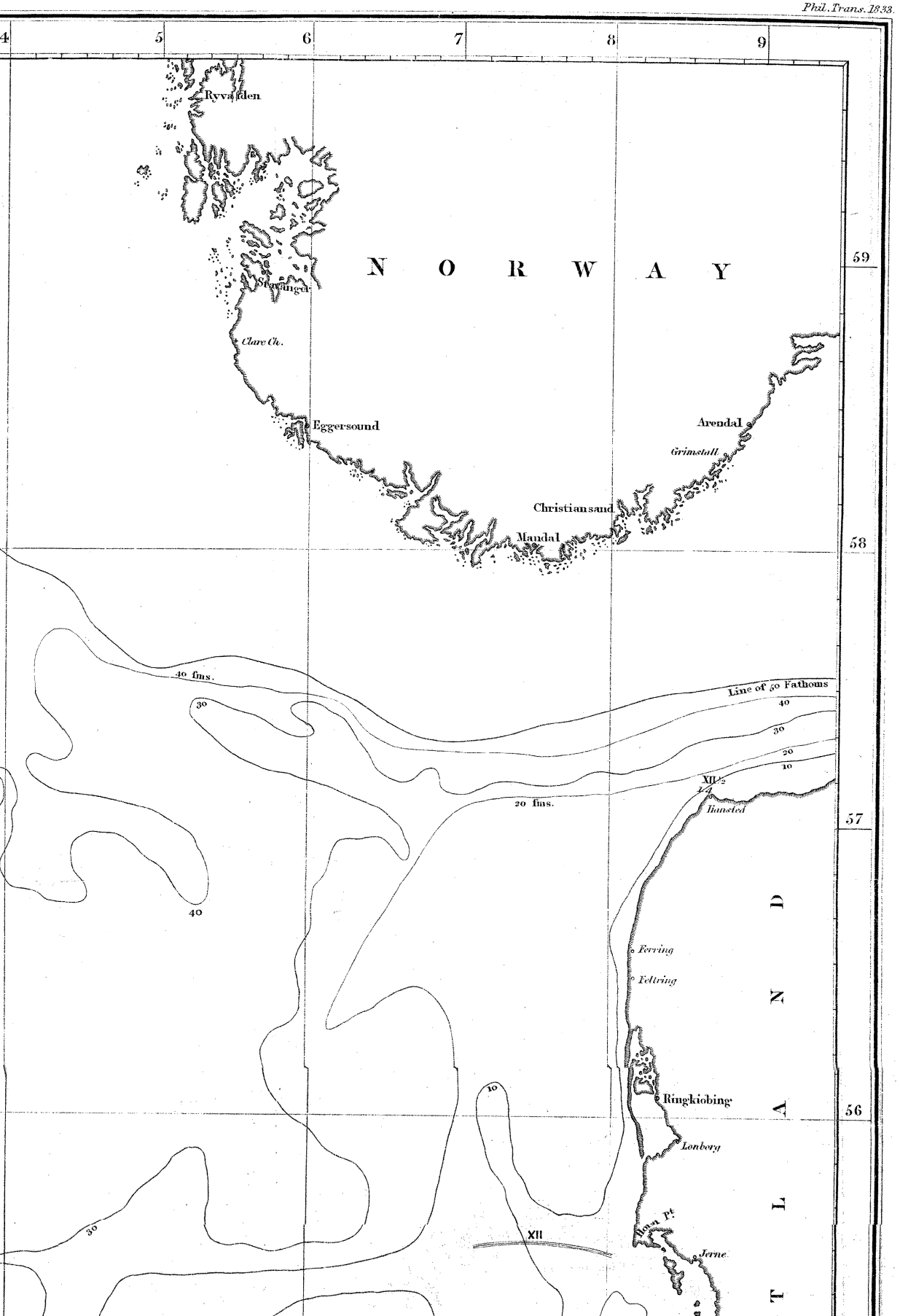
Line of 30 Fathoms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9
Ryvarden
N O R W A Y
59
Stavanger
Clare Ch.
Eggersound
Arendal
Grimstall
Christiansand
Mandal
58
40 fms.
30
Line of 50 Fathoms
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10
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Lonberg
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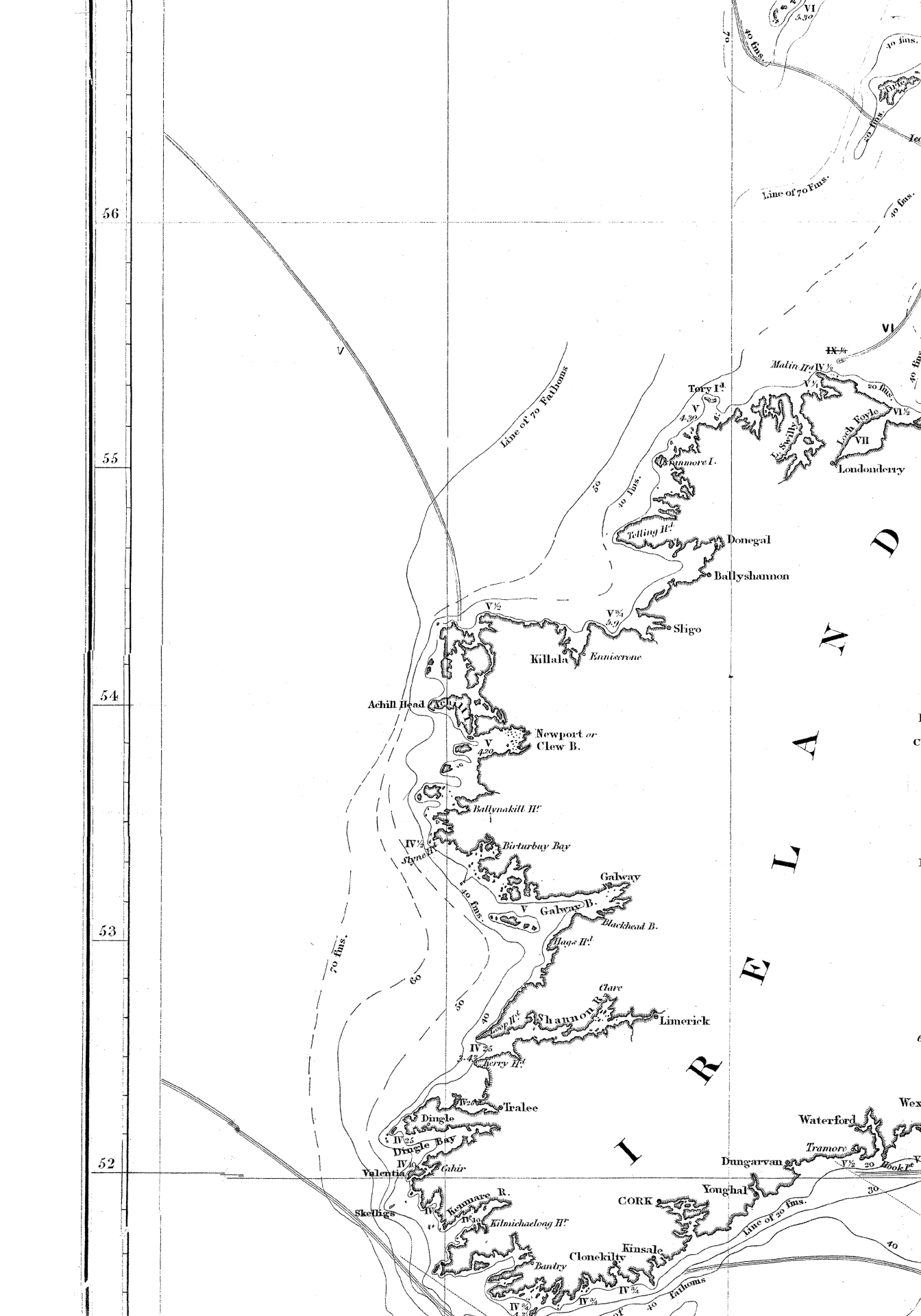
Horn Pt
Jerne


56
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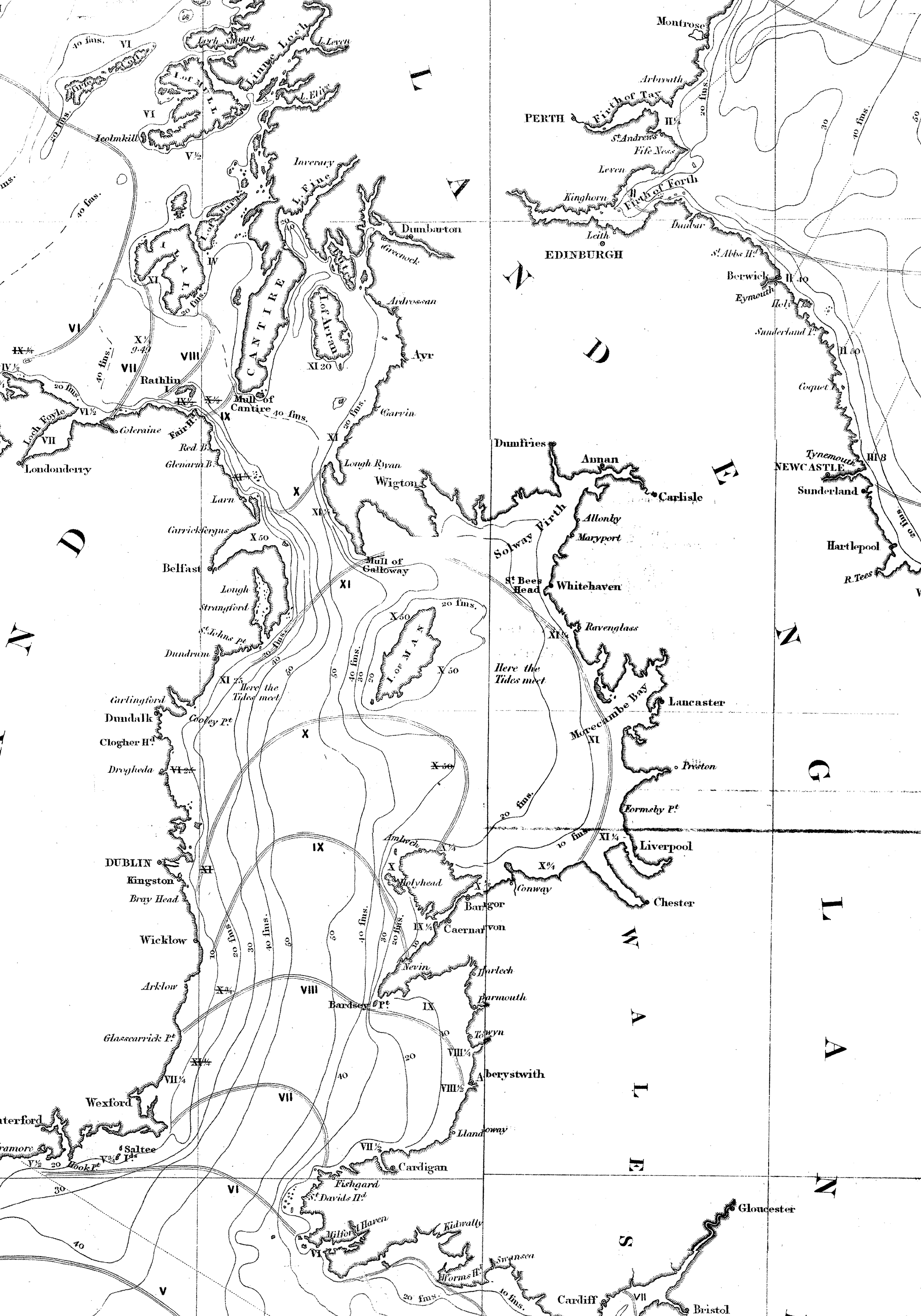
Line of 70 Fms.
70 fms.
40 fms.
30 fms.
20 fms.
Line of 70 Fathoms
Tory I.d
Malin Hd
Lough Foyle
Londonderry
Lough Swilly
Fanmore I.
Telling Hd
Donegal
Ballyshannon
Sligo
Killala
Eanisrone
Achill Head
Newport or Clew B.
Ballynakill Hr
Birturbay Bay
Slyne Hd
Galway
Galway B.
Blackhead B.
Loop Hd
Cave
Shannon R.
Limerick
Kerry Hd
Tralee
Dingle
Dingle Bay
Valentia
Cahir
Kenmare R.
Skelligs
Kilmichaeloag Hr
Bantry
Clonekilty
Kinsale
CORK
Youghal
Dungarvan
Tramore
Waterford
Line of 20 fms.
Fathoms
IRELAND



I R E L A N D
S C O T L A N D
E N G L A N D
W A L E S
Montrose
Arbroath
Firth of Tay
PERTH
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Fife Ness
Leven
Kinghorn
Firth of Forth
Dunbar
Leith
EDINBURGH
St. Abbs Hd.
Berwick
Eymouth
Holy I.
Sunderland Pt.
Coquet I.
Tynemouth
NEWCASTLE
Sunderland
Hartlepool
R. Tees
Loch Sunart
Linnhe Loch
L. Leven
L. Etive
I. of Mull
Icolmkill
Inverary
L. Fine
Dumbarton
Greenock
I. of Islay
Cantire
I. of Arran
Ardrossan
Ayr
Rathlin I.
Mull of Cantire
Garvin
Loch Foyle
Coleraine
Londonderry
Fair Hd.
Red B.
Glenarm B.
Lough Ryan
Wigton
Larn
Carrickfergus
Belfast
Mull of Galloway
Lough Strangford
St. Johns Pt.
Dundrum
Here the Tides meet
Carlingford
Dundalk
Cooley Pt.
Clogher Hd.
Drogheda
Dumfries
Annan
Carlisle
Solway Firth
Allonby
Maryport
St. Bees Head
Whitehaven
Ravenglass
I. of Man
Lancaster
Morecambe Bay
Preston
Formsby Pt.
Liverpool
Chester
Amlwch
Holyhead
Conway
Bangor
Caernarvon
DUBLIN
Kingston
Bray Head
Wicklow
Arklow
Glasscarrick Pt.
Wexford
Waterford
Tramore
Saltee Is.
Hook Pt.
Nevin
Harlech
Barmouth
Bardsey Pt.
Towyn
Aberystwith
Llandoway
Cardigan
Fishgard
St. Davids Hd.
Milford Haven
Kidwally
Swansea
Worms Hd.
Cardiff
Bristol
Gloucester
20 fms.
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Line of 30 Fathoms
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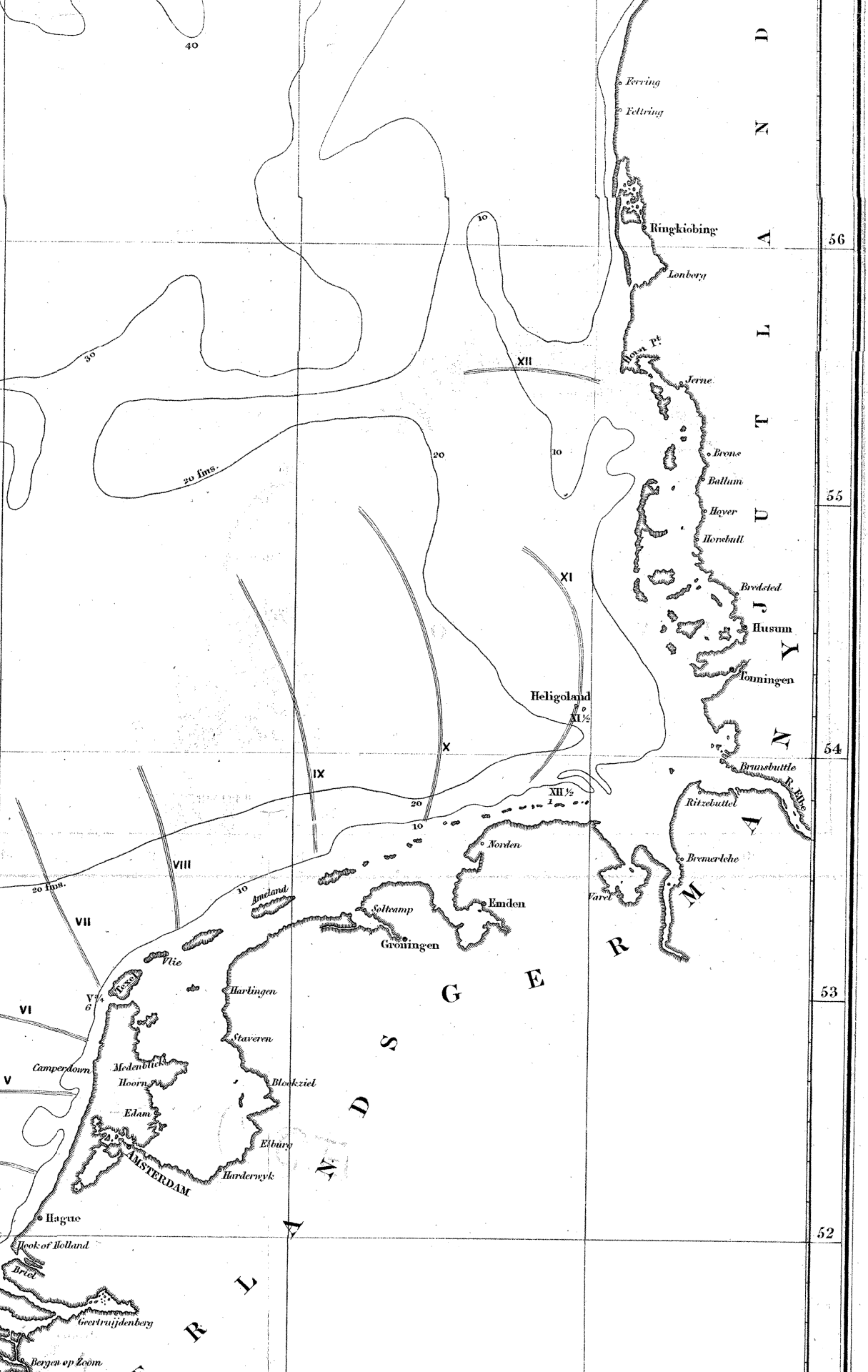
Hartlepool
R. Tees
Whitby
Scarborough
Flamborough Hd.
Bridlington B.
Hornsey
Hull
R. Humber
Grimsby
Spurn Hd.
Saltfleet
Sutton
Dudgeon
Ower and Lemon Shoals
Boston
Wells
Cley
Cromer
Lynn Regis
Winterton
Yarmouth
Lowestoffe
Southwold
Dunwich
Orford Ness
Harwich
Naze
Shoebury Ness
LONDON
R. Thames
Greenwich
Camperdown
Hague
Helder
Brielle
Flushing
Bergen op Zoom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Ringkiobing
Lonberg
Horn Pt.
Jerne
Brons
Ballum
Hoyer
Horsbull
Bredsted
Husum
Tonningen
Heligoland
XI½
Brunsbuttle
R. Elbe
Ritzebuttel
Brenerdehe
Norden
Emden
Varel
Ameland
Schelamp
Groningen
Vlie
Harlingen
Staveren
Camperdown
Medemblick
Hoorn
Blookziel
Edam
Elburg
AMSTERDAM
Harderwyk
Hague
Hook of Holland
Brie
Geertruijdenberg
Bergen op Zoom
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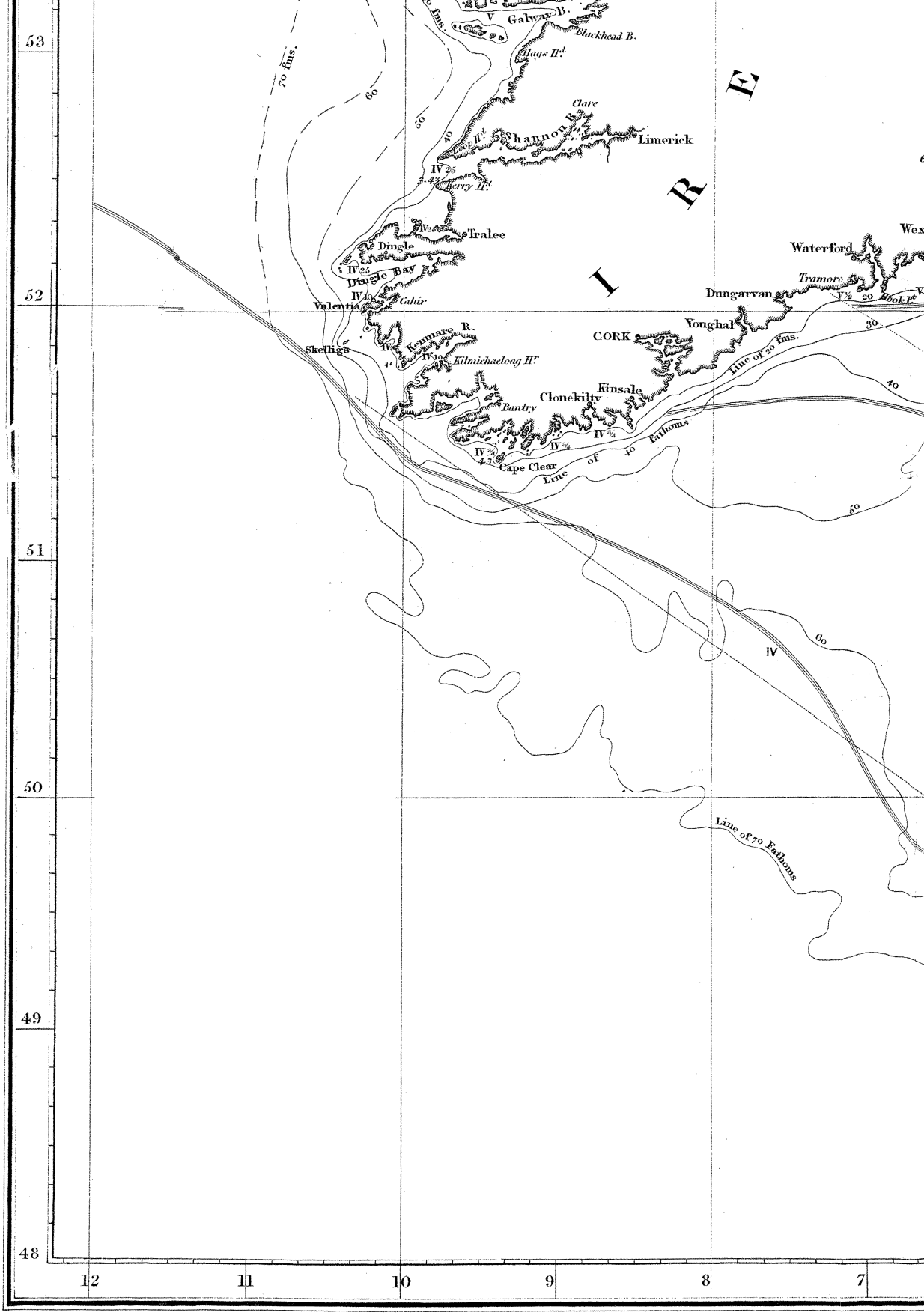
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Galway B.
Blackhead B.
Hags H.d
Clare
Shannon R.
Limerick
Loop H.d
Kerry H.d
Tralee
Dingle
Dingle Bay
Valentia
Cahir
Skelligs
Kenmare R.
Kilmichaeloag H.r
Bantry
Cloncilty
Kinsale
CORK
Youghal
Waterford
Tramore
Dungarvan
Line of 20 fms.
Cape Clear
Line of 40 Fathoms
Line of 70 Fathoms
IV
I R E

Bray Head
Wicklow
Arklow
Glasscarrick Pt
Wexford
Saltee
Hook Pt
Bardsey Pt
Barmouth
Aberystwith
Cardigan
Fishgard
St Davids Hd
Milford Haven
Kidwelly
Swansea
Worms Hd
Cardiff
Bristol
Gloucester
Chester
Lundy I
Ilfracombe
Barnstaple
Hartland Pt
Bude
Tintagell Hd
St Michaels
Padstow
St Ives
Falmouth
Mounts Bay
Lizard Pt
Foweys
Plymouth
Tor B.
Eddystone
Teignmouth
Exmouth
Lyme Regis
Bridport
Weymouth
Portland Bill
Poole
Southampton
Isle of Wight
Needles
Alderney
Guernsey
Sercq
Jersey
Cherbourg
C. Rosel
Lessay
Bec d'Agon
Granville
Minquiers
Ushant
Brest
Porspoder
Goulven
Morlaix
Tregnier
St Michel
S. Brieuc
C. Frehel
St Malo
Douarnenez Bay
WALES
SEA
FRANCE
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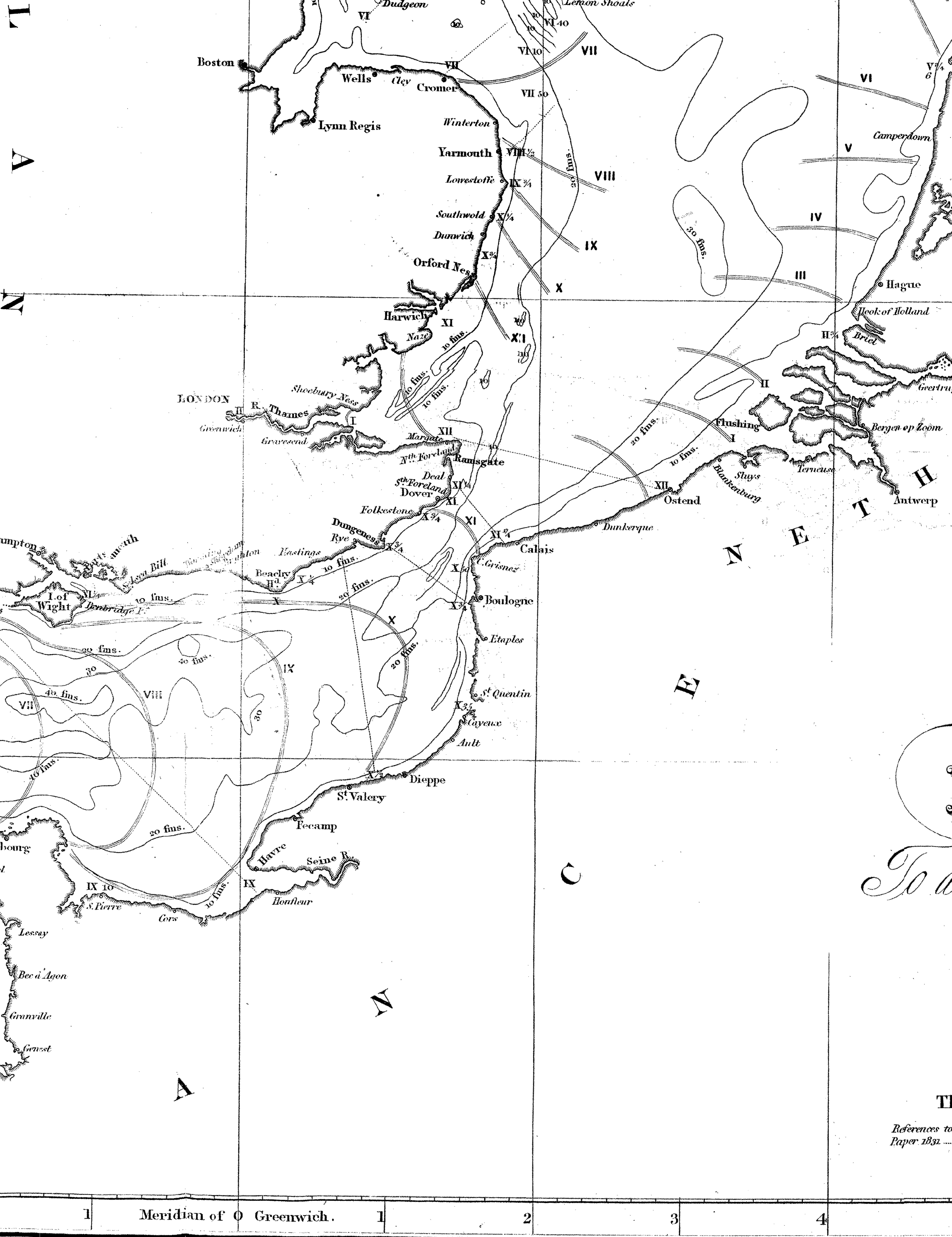
Dudgeon
Lemon Shoals
Boston
Wells
Cley
Cromer
Lynn Regis
Winterton
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Lowestoffe
Southwold
Dunwich
Orford Ness
Harwich
Naze
Camperdown
Hague
Hook of Holland
Briel
Flushing
Bergen op Zoom
Sluys
Blankenburg
Terneuse
Antwerp
LONDON
R. Thames
Greenwich
Gravesend
Shoebury Ness
Margate
Nth. Foreland
Ramsgate
Deal
St. Foreland
Dover
Folkestone
Dungeness
Rye
Hastings
Beachy Hd.
I. of Wight
Dunbridge P.
Calais
Grisnez
Boulogne
Etaples
St. Quentin
Cayeux
Ault
Dieppe
St. Valery
Fecamp
Havre
Seine R.
Honfleur
S. Pierre
Cors
Lessay
Bec d'Agon
Granville
Ostend
Dunkerque
10 fms.
20 fms.
30 fms.
40 fms.
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Meridian of 0 Greenwich.
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References to
Paper 1832

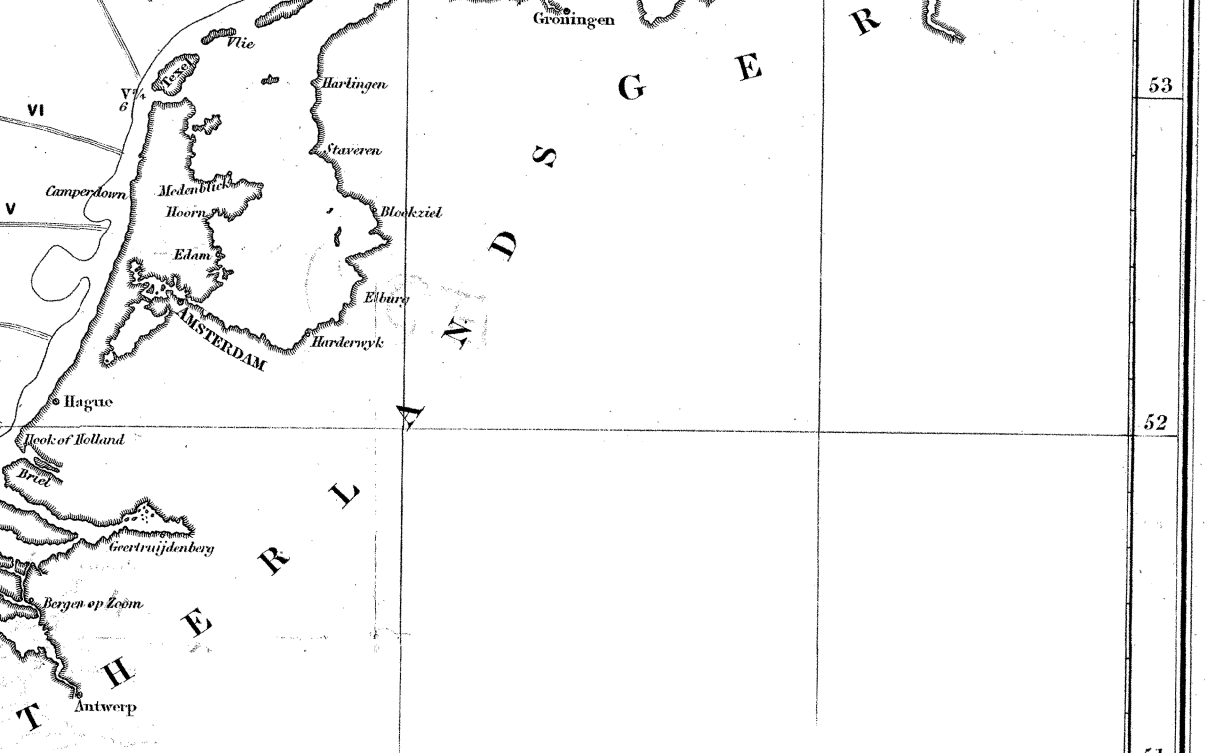

CHART of the BRITISH ISLES.

To accompany Mr Whewell's Paper on the **TIDES.**

The lines marked thus III IV V are COTIDAL LINES

References to Mr Lubbocks Paper 1831 { The Roman figures shew the Time of High Water in Greenwich Time at new and full Moon. / The Italic ..... at the Place .....

J.& C.Walker Sculp.t